

Quality Report



Generated with Pix4Denterprise version 3.3.24



Important: Click on the different icons for:



Help to analyze the results in the Quality Report



Additional information about the sections



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Summary



Project	M2017112
Processed	2017-11-13 22:43:22
Camera Model Name(s)	ILCE-6000_E20mmF2.8_20.0_6000x4000 (RGB)
Average Ground Sampling Distance (GSD)	1.35 cm / 0.53 in
Area Covered	0.0643 km ² / 6.4346 ha / 0.0249 sq. mi. / 15.9085 acres
Time for Initial Processing (without report)	01h:28m:06s

Quality Check



Images	median of 55741 keypoints per image	
Dataset	178 out of 178 images calibrated (100%), all images enabled	
Camera Optimization	3.17% relative difference between initial and optimized internal camera parameters	
Matching	median of 18605.2 matches per calibrated image	
Georeferencing	yes, no 3D GCP	

Preview

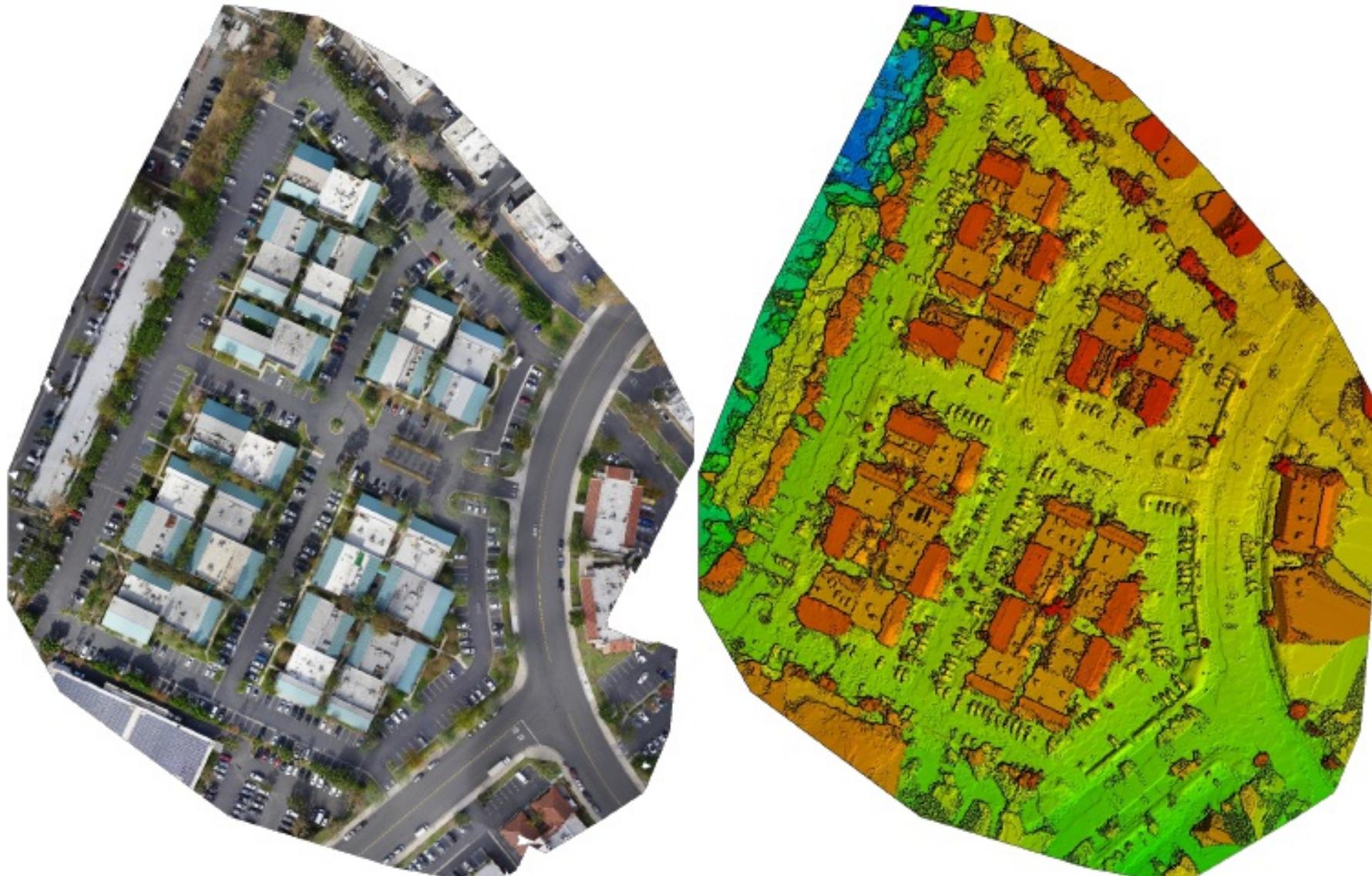


Figure 1: Orthomosaic and the corresponding sparse Digital Surface Model (DSM) before densification.

Calibration Details



Number of Calibrated Images	178 out of 178
Number of Geolocated Images	178 out of 178

Initial Image Positions

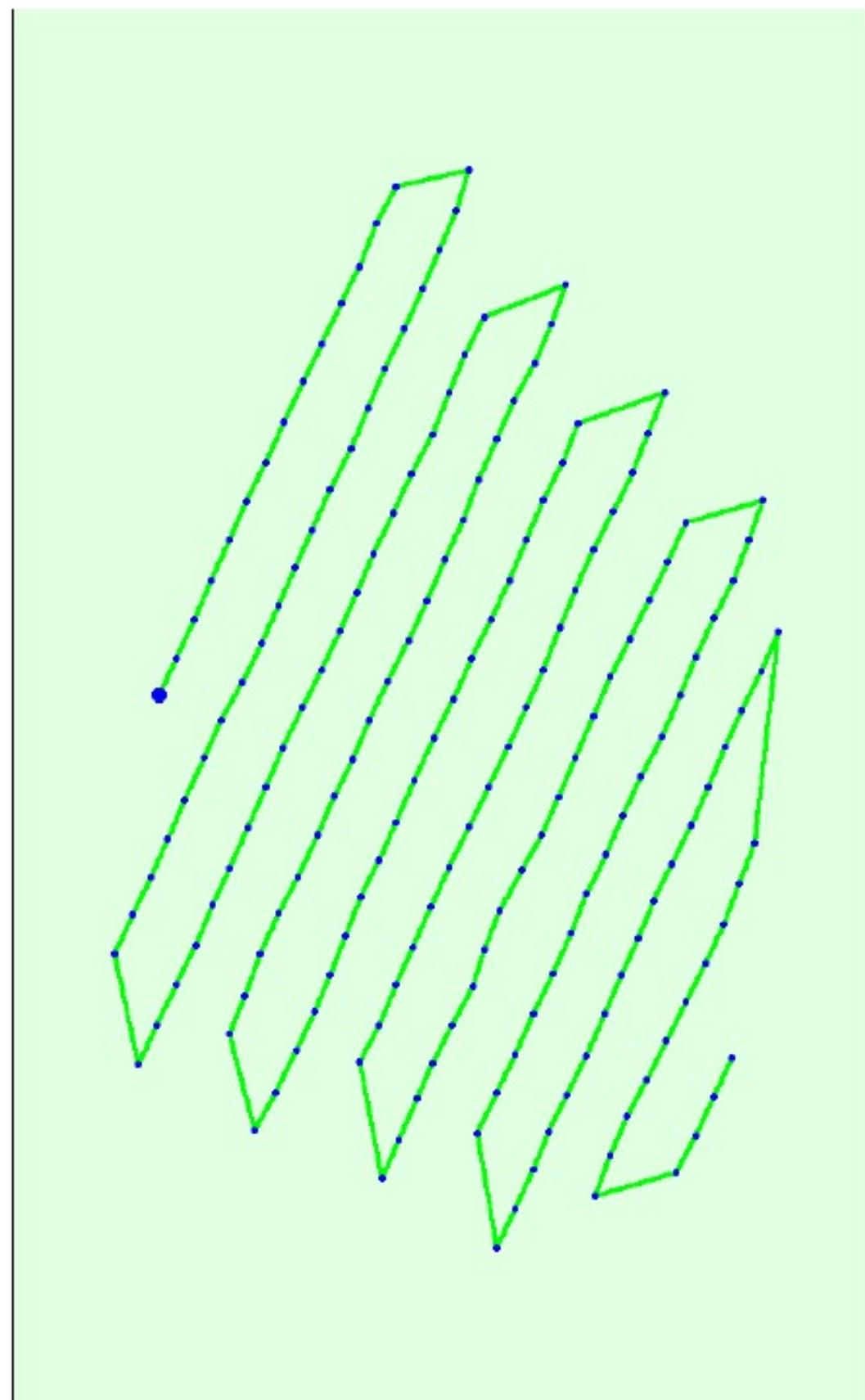
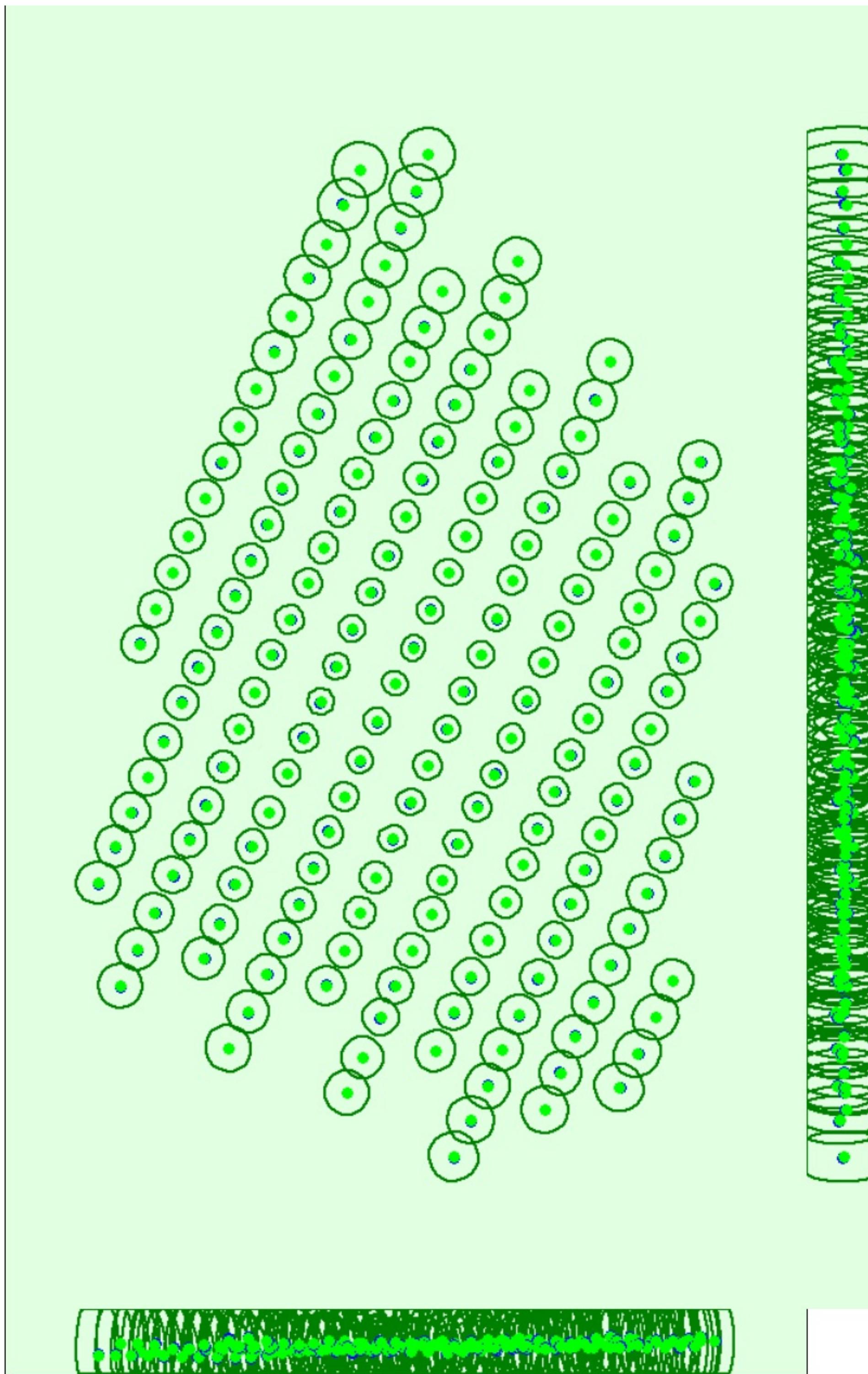


Figure 2: Top view of the initial image position. The green line follows the position of the images in time starting from the large blue dot.

Computed Image/GCPs/Manual Tie Points Positions





Uncertainty ellipses 50x magnified

Figure 3: Offset between initial (blue dots) and computed (green dots) image positions as well as the offset between the GCPs initial positions (blue crosses) and their computed positions (green crosses) in the top-view (XY plane), front-view (XZ plane), and side-view (YZ plane). Dark green ellipses indicate the absolute position uncertainty of the bundle block adjustment result.

Absolute camera position and orientation uncertainties



	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.105	0.105	0.254	0.170	0.157	0.059
Sigma	0.018	0.018	0.055	0.004	0.004	0.006

Overlap

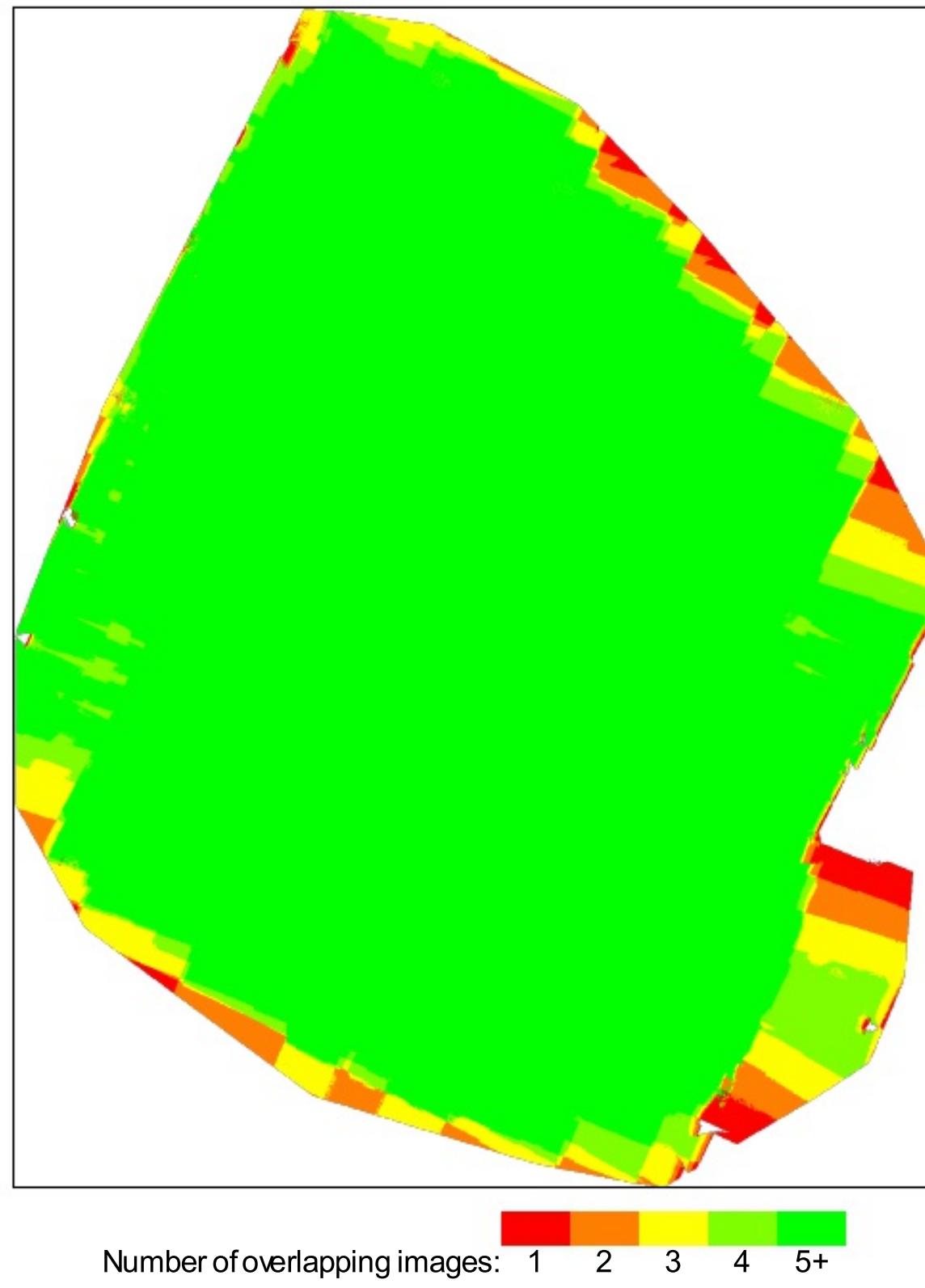


Figure 4: Number of overlapping images computed for each pixel of the orthomosaic.
Red and yellow areas indicate low overlap for which poor results may be generated. Green areas indicate an overlap of over 5 images for every pixel. Good quality results will be generated as long as the number of keypoint matches is also sufficient for these areas (see Figure 5 for keypoint matches).

Bundle Block Adjustment Details

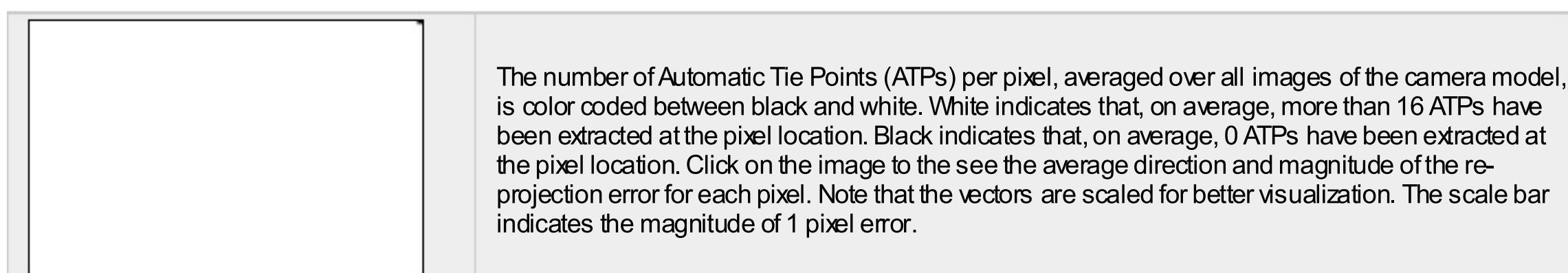
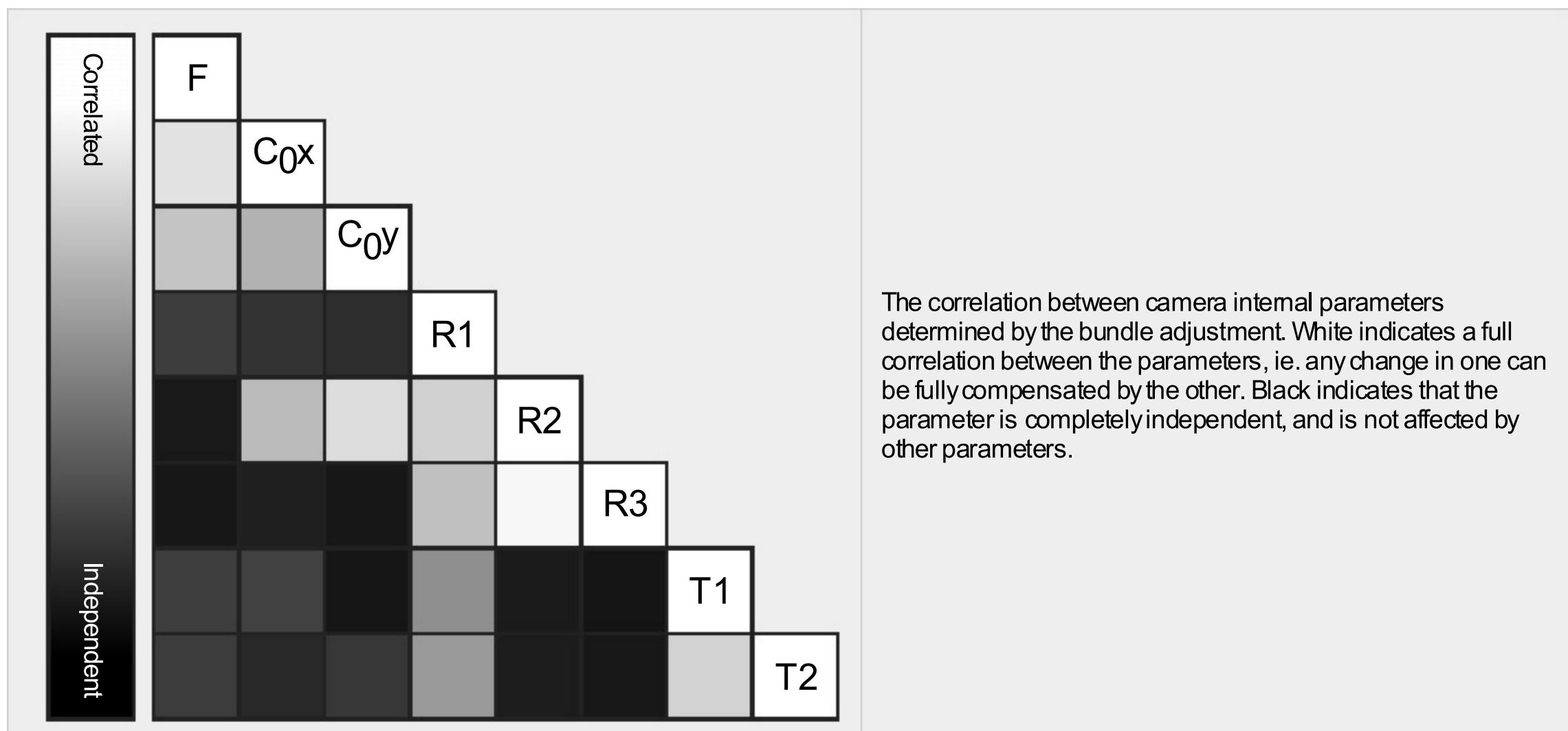
Number of 2D Keypoint Observations for Bundle Block Adjustment	3235365
Number of 3D Points for Bundle Block Adjustment	1080330
Mean Reprojection Error [pixels]	0.210

Internal Camera Parameters

ILCE-6000_E20mmF2.8_20.0_6000x4000 (RGB). Sensor Dimensions: 23.333 [mm] x 15.556 [mm]

EXIF ID: ILCE-6000_E20mmF2.8_20.0_6000x4000

	Focal Length	Principal Point x	Principal Point y	R1	R2	R3	T1	T2
Initial Values	5142.857 [pixel] 20.000 [mm]	3000.000 [pixel] 11.667 [mm]	2000.000 [pixel] 7.778 [mm]	0.000	0.000	0.000	0.000	0.000
Optimized Values	5306.370 [pixel] 20.636 [mm]	2920.766 [pixel] 11.359 [mm]	2027.787 [pixel] 7.886 [mm]	-0.160	0.143	0.016	0.002	-0.001
Uncertainties (Sigma)	0.685 [pixel] 0.003 [mm]	0.190 [pixel] 0.001 [mm]	0.103 [pixel] 0.000 [mm]	0.000	0.000	0.001	0.000	0.000



2D Keypoints Table



	Number of 2D Keypoints per Image	Number of Matched 2D Keypoints per Image
Median	55741	18605
Mn	21681	3983
Max	90107	23012
Mean	55542	18176

3D Points from 2D Keypoint Matches

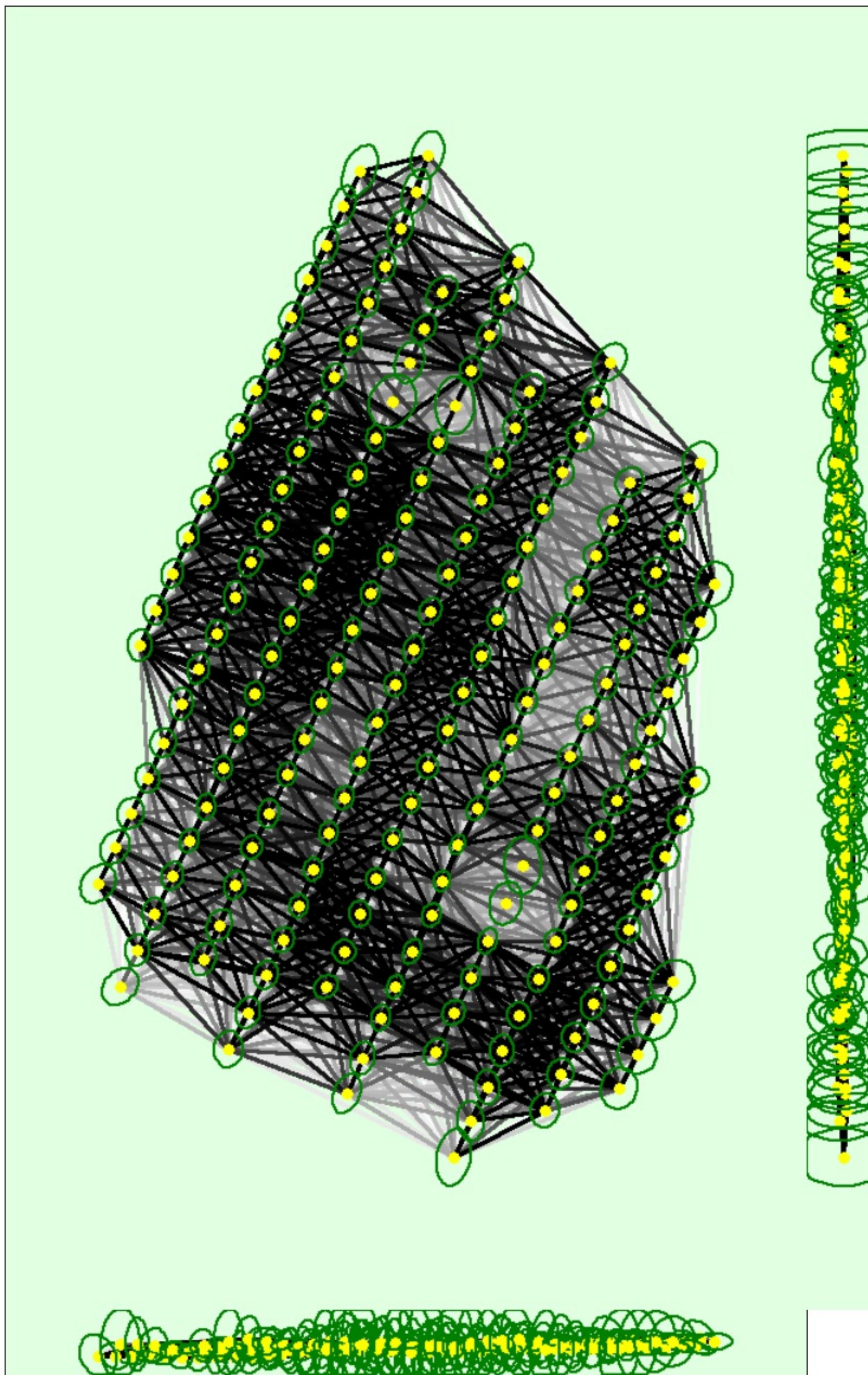


	Number of 3D Points Observed
In 2 Images	700916
In 3 Images	169157
In 4 Images	77058
In 5 Images	42511
In 6 Images	24203
In 7 Images	16707
In 8 Images	12508
In 9 Images	9210
In 10 Images	6485
In 11 Images	5110
In 12 Images	3918
In 13 Images	3239
In 14 Images	2522
In 15 Images	1992
In 16 Images	1609
In 17 Images	1261
In 18 Images	703
In 19 Images	452
In 20 Images	286
In 21 Images	232
In 22 Images	122
In 23 Images	65

In 24 Images	33
In 25 Images	17
In 26 Images	7
In 27 Images	6
In 28 Images	1

2D Keypoint Matches

1



25 222 444 666 888 1111 1333 1555 1777 2000

Figure 5: Computed image positions with links between matched images. The darkness of the links indicates the number of matched 2D keypoints between the images. Bright links indicate weak links and require manual tie points or more images. Dark green ellipses indicate the relative camera position uncertainty of the bundle block adjustment result.

Relative camera position and orientation uncertainties



	X[m]	Y[m]	Z[m]	Omega [degree]	Phi [degree]	Kappa [degree]
Mean	0.004	0.004	0.005	0.008	0.008	0.002
Sigma	0.001	0.001	0.003	0.004	0.004	0.001

Geolocation Details



Absolute Geolocation Variance



Mn Error [m]	MaxError [m]	Geolocation Error X[%]	Geolocation Error Y[%]	Geolocation Error Z[%]
-	-15.00	0.00	0.00	0.00
-15.00	-12.00	0.00	0.00	0.00
-12.00	-9.00	0.00	0.00	0.00
-9.00	-6.00	0.00	0.00	0.00
-6.00	-3.00	0.00	0.00	0.00
-3.00	0.00	47.19	46.63	52.25
0.00	3.00	52.81	53.37	47.75
3.00	6.00	0.00	0.00	0.00
6.00	9.00	0.00	0.00	0.00
9.00	12.00	0.00	0.00	0.00
12.00	15.00	0.00	0.00	0.00
15.00	-	0.00	0.00	0.00
Mean [m]		-0.000000	-0.000000	-0.000000
Sigma [m]		0.136588	0.146527	0.226291
RMS Error [m]		0.136588	0.146527	0.226291

Min Error and Max Error represent geolocation error intervals between -1.5 and 1.5 times the maximum accuracy of all the images. Columns X, Y, Z show the percentage of images with geolocation errors within the predefined error intervals. The geolocation error is the difference between the initial and computed image positions. Note that the image geolocation errors do not correspond to the accuracy of the observed 3D points.

Relative Geolocation Variance



Relative Geolocation Error	Images X[%]	Images Y[%]	Images Z[%]
[-1.00, 1.00]	100.00	100.00	100.00
[-2.00, 2.00]	100.00	100.00	100.00
[-3.00, 3.00]	100.00	100.00	100.00
Mean of Geolocation Accuracy [m]	5.000000	5.000000	10.000000
Sigma of Geolocation Accuracy [m]	0.000000	0.000000	0.000000

Images X, Y, Z represent the percentage of images with a relative geolocation error in X, Y, Z.

Initial Processing Details



System Information



Hardware	CPU: Intel(R) Xeon(R) CPU @ 2.50GHz RAM: 32GB GPU: RDPUDD Chained DD (Driver: unknown)
Operating System	Windows Server 2016 Datacenter, 64-bit

Coordinate Systems



Image Coordinate System	WGS84 (egm96)
Output Coordinate System	WGS84 / UTMzone 11N (egm96)

Processing Options



Detected Template	No Template Available
Keypoints Image Scale	Full, Image Scale: 1
Advanced: Matching Image Pairs	Aerial Grid or Corridor
Advanced: Matching Strategy	Use Geometrically Verified Matching: no
Advanced: Keypoint Extraction	Targeted Number of Keypoints: Automatic
Advanced: Calibration	Calibration Method: Standard Internal Parameters Optimization: All External Parameters Optimization: All Rematch: Auto, yes

Point Cloud Densification details



Processing Options



Image Scale	multiscale, 1/2 (Half image size, Default)
Point Density	Optimal
Minimum Number of Matches	3
3D Textured Mesh Generation	yes
3D Textured Mesh Settings:	Resolution: Medium Resolution (default) Color Balancing: no
LOD	Generated: no
Advanced: 3D Textured Mesh Settings	Sample Density Divider: 1
Advanced: Image Groups	group1
Advanced: Use Processing Area	yes
Advanced: Use Annotations	yes
Time for Point Cloud Densification	58m:33s
Time for 3D Textured Mesh Generation	24m:43s

Results



Number of Generated Tiles	1
Number of 3D Densified Points	27874286
Average Density (per m ³)	1075.16

DSM, Orthomosaic and Index Details



Processing Options



DSMand Orthomosaic Resolution	1 x GSD (1.35 [cm/pixel])
DSMFilters	Noise Filtering: yes Surface Smoothing: yes, Type: Sharp
Raster DSM	Generated: yes Method: Inverse Distance Weighting Merge Tiles: yes

Orthomosaic	Generated: yes Merge Tiles: yes GeoTIFF Without Transparency: no Google Maps Tiles and KML: yes
Contour Lines Generation	Generated: yes Contour Base [m]: 0 Elevation Interval [m]: 10 Resolution [cm]: 100 Minimum Line Size [vertices]: 20
Time for DSM Generation	25m:53s
Time for Orthomosaic Generation	51m:47s
Time for Contour Lines Generation	50s